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ABSTRACT

Program budgeting is an extension and refinement of budgeting processes developed during the last half century. The purpose of this paper is to investigate the theory, philosophy, and techniques of this new process, and to develop a conceptual framework for its use. An account of the historical development of Planning Programming Budgeting Systems (PPBS) is followed by a description of its conceptual framework which includes a list of program budgeting procedures. Section IV of the paper concerns the measurement of physical performance; section V discusses approaches to physical measurement and section VI presents the application of discounted cash flow to PPBS and includes a definition of discounted cash flow. (NH)

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The Development and History of the Concept of PPB

by

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Paper presented at an Institute on Program Planning and Budgeting Systems for Libraries at Wayne State University, Detroit, Michigan, Department of Library Science, Spring 1968

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Introduction

by
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The following paper was presented at an institute on Program Planning and Budgeting Systems for Libraries, held at Wayne State University under the Higher Education Act, Title IIB, in the spring of 1968.

The intent of the institute was to introduce administrators and finance officers of large libraries, public, state, and academic to the principles and procedures of PPBS.

Each participant in the institute brought with him the most recent budget document from his own library, and with the help of the institute staff, attempted to convert it into a PPBS presentation.

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I. INTRODUCTION —

Efficient use of scarce and limited resources, and effective employment of these resources is the basic objective of all budget processes. Through the guidance of systematic presentation and conceptual analysis, establishing goals and setting forth the ways and means by which these goals may be attained, program budgeting recently emerged as an operational and organized process through which allocation problems can be substantially reduced.

Program budgeting is an extension and refinement of budgeting processes developed during the last half century. The purpose of this paper is to investigate the theory, philosophy, and techniques of this new process, and to develop a conceptual framework for its use.

II. HISTORY

Although program budgeting is a relatively new concept, it has an interesting history. Developed by the Rand Corporation and first used extensively by the U.S. Air Force, Secretary of Defense Robert McNamara requested in 1961 that the entire Department of Defense adopt program budgeting for all defense operations. In 1965, President Johnson announced that all major federal non-defense agencies are instructed to operate under a program budgeting technique.

Planning-Programming-Budgeting

Elements of program budgeting have been employed in various parts of the federal budgetary process almost from the beginning. Applications were infrequent until the 1930's, when both the Department of Agriculture and the Tennessee Valley Authority used program budgeting. Other Federal Agencies began to develop budgets on a program basis, and in 1949 the Commission on Organization of the Executive Branch of Government (Hoover Commission) recommended the entire budgetary concept of the Federal Government adopt a budget based on functions, activities, and projects. The commission officially called it a "performance budget."

The Hoover Commission defined the function of program budgeting as follows: "such a document would analyze the work of government departments and agencies according to their major functions, activities, or projects. It would then concentrate attention on the work to be done or service to be rendered rather than on things to be acquired such as personal services, supplies, materials, and equipment. A performance budget would facilitate Congressional and Executive control by clearly showing the scope and magnitude of each Federal activity. It would also show the relationships between the value of work to be done and the cost of the work, a measurement which could not be made under the present system."

Although the recommendations of the commission were not followed, it did have an impact on government operations. The 1949 amendments to the National Securities Act of 1947, provided for performance budgeting in the Department of Defense. The Budget and Accounting Procedure Act of 1950 provided for an executive budget based on the functions and activities of

government but did not use the phrase "performance budget." In accumulating the 1951 fiscal budget, the Bureau of the Budget encouraged a form of performance budgeting throughout the government.

In 1955, the second Hoover Commission re-emphasized its first recommendation using the phrase "program budget" rather than "performance budget." Its recommendations were "that the executive branch continue its operating budget based upon functions and projects adequately supported by information on costs and accomplishments, and that agencies take further steps to synchronize their organization, budget classifications, and accounting systems. Budgets for the Executive Agency were also to be formulated and administered on a cost basis in the future."

During this time the comprehensive long-range planning which began to develop among the large corporationsof the nation was slowly being reflected in the executive branch of the Federal Government. Several major steps in the development of program budgeting in the Executive Branch are presented here.

In his budget presentation for the fiscal year 1952, President Truman said that the financial program of the government could not be planned in terms of a single year. It had to be prepared, in light of security, economic, and budgetary goals, for the next three and possible four years. Not until ten years later was his recommendation implemented in practice. During this time support was given to the idea by the success of the Department of the Interior while working with Congress in receiving approval for fiscal year 1956 for its 'mission 66' (a ten year program for the National Park Service). This program stimulated

interest among other agencies.

Probably the first official, comprehensive, long-range projection of all Federal expenditures was made in 1961, when the director of the Bureau of the Budget released his ten-year projection of all federal expenditures. In the same year the Federal Aviation Agency place all its programs on a five-year planning basis.

In preparing the 1963 fiscal budget, a number of agencies, at the suggestion of the Bureau of the Budget, made five-year projections reflecting the budget-making process of that year.

Similarly, in the preparation of the fiscal 1964 and 1965 budgets, the Bureau encouraged budget preparation on the basis of long-range plans. In calendar year 1964, preparation of the 1966 budget proceeded in two broad stages. First, a spring projection was made on the basis of information about agency goals and programs through the coming decade. Second, in the annual fall budget submissions, agencies were asked to submit information covering the past year, the current year, and the next three succeeding years.

An example of program elements included in the Federal budgets is the budget for Estimated Federal Expenditures for Health and Related Purpose, fiscal year 1965. This budget was divided into five program elements: control and prevention, treatment and restoration, long-term care and domiciliary maintenance, training and research. Each of these five programs was broken down into several sub-programs. For example, the control and prevention program was broken down into the following sub-programs: infectious and allergic diseases, neurologic and degenerative

diseases, chronic diseases and those of age, accidents and occupational hazards, child health and nutrition, and other (including environmental health).

State governments have also accepted the program-type budget. Some states have made considerable progress while others are still in the early stages of development. Even the most advanced state budget systems have room for improvement. Among the states having the greatest success toward program budgeting systems are Illinois, Kentucky, Maryland, Michigan, and Oklahoma.

Long before the phrase "performance budgeting" was popularized by the Hoover Commission, several cities had what is commonly called "functional" or "activity" budgeting. The city of Richmond, Virginia, is considered to have one of the better developed budgets in terms of program and performance. Others in which notable progress has been made are: Detroit, Rochester, San Diego, Los Angeles, Berkeley, Kansas City, Wichita, Denver, and Phoenix.

In the summer of 1966, the Office of Research, Plans, Programs and Evaluation of the Office of Economic Opportunity put together an anti-poverty plan and a four-year program based upon that plan, for OEO and for the Total War on Poverty of which OEO-funded programs are a part. OEO was probably the first civilian agency to do this.

III. CONCEPTUAL FRAMEWORK

To analyze the relative benefit of program and conventional budgeting, a review of the basic precepts of budgeting is necessary. Budgeting can be an active, aggressive tool of planning and for promoting the welfare of the organization. Although this comment is primarily directed to the private sector, it can apply equally as well to government agencies. In the case of government institutions, however, additional considerations must be made. One must remember that the ultimate authority in any government institution is the public. Since the majority of the public is unfamiliar with budgeting philosophy and techniques, we must assume the responsibility of informing them about the financial activities of their government institutions. Program budgeting, in addition to all of its other relative advantages over conventional or line-item budgeting, offers an opportunity to convey financial information to the public in a form that they can readily understand.

To illustrate this, consider the budgeting process of a police department. A conventional budget would request the appropriation for the purchase and operation of so many patrol cars, mobil radios, maintenance, and supplies. The only evaluation that might be forthcoming is that in return for the expenditures indicated, the municipality would receive "good police protection." In this case the public would not be able to relate specific expenditures to personal benefits. Under conventional budgeting it would be difficult, if not impossible, for the public to estimate the benefits derived from "X" dollars of office supplies, or from the salary of a department secretary.

Under program budgeting, the public would be informed that a certain program such as a burglary prevention and detection program cost "X" dollars, and that such a program netted a savings of "X" dollars worth of goods whoe theft was prevented, and a savings of "Y" dollars in stolen goods which were recovered. The relationship (ratio) of benefits to cost is then computed which would demonstrate the value of the program, and the efficiency of the department. A composite cost-benefit ratio would demonstrate the efficiency and the value of the entire force, and if amny police departments in the country used program budgeting, the public in each city involved would have a standard of comparison to measure the effectiveness of their police department with that of other cities.

The new program-budget procedure has two primary aims -- first, to permit analysis of total force structures for all of the services in terms of common goals or objectives; second, to protect the resource impact (or financial requirements) of the proposed force structures over an extended period of years.

The specific contribution of the programmed budget concept to real-life planning will be shaped by 3 characteristics of the recommended design. The first characteristic is the projection of costs through an extended period of years. A second is the grouping of budget items, many of which are presently scattered through a number of departments and bureaus. The third is encouragementof cost-utility analysis.

Of great structural importance is the idea that meaningful programs should be concerned with specific objectives covering an appropriately long period of time. In government, pastand current budgeting emphasis centers

predominantly on short time periods. The modern concept of program budgeting emphasizes the long-range perspectives. This is a framework within which short-range specific decisions are made. Behind current annual budgets there exists sophisticated long-range planning.

The extent to which governments pursue particular objectives, and the character of the objectives themselves, will be influence by the resources available, but the extent to which the government desires to pursue its objectives will influence the resources it makes available to itself by taxation or other means. Planning, programming, and budgeting constitute the process by which objectives and resources, and the relationships among them, are taken into account to achieve a coherent and comprehensive program of action for the total government.

There are three major phases of program budgeting: planning, programming, and budgeting.

Planning isused here to mean that process whereby an organization establishes its long-run purposes and objectives. These purposes and objectives may be identified through qualitative statements, but they should make explicit the basic and enduring policies intended. This means that all executive personnel should feel a sense of involvement in the planning process. It must not be a remote, once-a-year event precipitated upon them by analytical studies group. There can and should be planning leadership, but the execution of the planned achievements must have meaning to and be rewarding to all levels of the organization. Long-range purposes and objectives are reflected in major programs, but number and types of major programs pursued are functionally related to and derived from the

long-range plan.

Programming is the process by which the organization can specify more immediate shorter-range goals for each of its operating units, these goals reflecting rather directly the results of planning.

Budgeting is simply the formulation of an annual or biennial plan, making explicit the composition and extent of all the program elements dealt with in the programming phase.

Program budgeting involves the use of budgetary techniques that facilitate explicit consideration of the pursuit of policy objectives in terms of their economic costs, both at the present time and in the future. The task of making the necessary compromises among various objectives is the function of planning, programming, and budgeting. To make these compormises, it is necessary that the various government activities be expressed in a common denominator of dollars.

There are, however, a multitude of ways in which money can be spent on, let us say, defense or education. To make intelligent comparisons, each of these major functions must be broken down into meaningful sub-functions. Education must be broken down at least into primary, secondary, and tertiary education. Major programs should thus be considered in terms of sub-programs, and at the end of the scale one reaches the manpower, material, and supplies used by the government in support of these activities.

It should be evident that designation of activities or programs is no simple matter. The way in which a program structure is set up for a governmental agency, or for any major segment, can have a profound effect on the decisions that are reached, so that the composition of the programs should

be regarded as an important part of the decision-making process. The following are some of the criteria which should be taken into account:

1. An important criterion for a program is that it should permit comparison of alternative methods of pursuing an imperfectly determined policy objective. Thus the need for public assistance, as an example, can be clarified and analyzed by breaking down the problem into the needs arising from old age, economic dependence, physical disability, and unemployment. Limited resources prevent provisions for all cases under these categories.
2. Even though objectives may be clearly defined there are usually alternative ways of accomplishing them.
3. Programs may also consist of a number of complementary components, none of which can be effective without the others. A health program requires doctors, nurses and hospitals in the right proportions.
4. A separate program may be needed where one part of an organization supplies services to several others. Economies are to be expected if a department has a single computer operation rather than separate ones in each bureau, so that departmental planning is likely to require that computers be budgeted as a separate program, even though they are far removed from the end objectives of the department.
5. An organization's objectives may require it to adopt overlapping structures. This need is evident in foreign affairs, where both geographical and functional programs are required.
6. A further criterion related to the time span over which expenditures take effect. The uncertainties of the future usually preclude firm

estimates of requirements for government services beyond a limited period, say, five years. Yet, research and development and investment must be undertaken to provide for a ~~longer run~~ more remote future, where activities can be identified with some major program.

A general distinction that may be useful is that between the final and intermediate programs of an organization. Final programs can be regarded as those that contribute to final programs in the immediate or remote future. Thus, in the Department of Defense, strategic forces, general purpose forces, and possible air defense can be considered final programs, while all others are intermediate. From the point of the government as a whole, however, defense becomes the final program, and its components are intermediate.

In summary, Program budgeting includes the following procedures:

1. The formulation of broad and overall objectives. These objectives will form the basis for other decisions. These are long-range objectives which set forth reasonable and flexible limitations.
2. Suggesting and forming alternative means of achieving these objectives.
3. Refining the goals and alternatives into realistic and workable concepts, considering available resources and the probability of any derived benefits.
4. Decisions made to determine which alternatives can best carry out the derived objectives.
5. Specific programs are set up to handle the adopted alternatives.
6. An attempt is made to quantify each variable component. Long-range and short-range budgets are formulated.

Each of the above steps is closely interrelated, and highly dependent one upon another, and to some extent they are simultaneous cause-effect relationships.

Effective budgeting, particularly PPB, encourages inquiry into all possible techniques which may increase the benefits gained from utilizing limited assets, as well as enhance the understanding and implications of managing such techniques.

IV. MEASUREMENT OF PHYSICAL PERFORMANCE

The use of program budget makes possible the measurement of work performance in a manner that will help strengthen the decision-making process at various levels of management. The primary objectives are to obtain physical results achieved through work effort and to establish pertinent relationships between the results and the use of available resources. These objectives provide data to help develop and present proposals, assign personnel, and allocate funds to specific areas. Such measures are of assistance in replanning and reprogramming when needed to accomodate program changes. These changes are important in the light of unexpected developments or unsatisfactory comparisons between performance of similar types of operations.

In its ultimate application, program budgeting employs physical measures and ratios reflecting resource utilization in all operating organizations where the cost of obtaining the desired data does not exceed the programs benefits to management. At the beginning of the programs

application, minimum measures of work in significant program areas may be sufficient to meet immediate needs. Action at a later time can be taken on the basis of practical experience to develop additional measures and ratios, but in any event, the possible adoption of program budgeting in individual departments should not be abandoned because of the lack of existing data on physical measures. Such measures can be developed and refined after steps have been taken toward the outlined objectives, the establishment of suitable program classifications for the administration budget, and the related adjustment of the financial management system to provide appropriate financial data.

V. APPROACHES TO PHYSICAL MEASUREMENT

Under program budgeting, departments satisfy the purposes for which they are established by carrying out programs that produce end products or services to the general public. Programs, in turn, accomplish the activities and tasks representing the work performed to produce the end products and services. These end products, services, and work accomplishments represent the outputs of a department and its constituent organizations which contribute toward attaining the goals and objectives implicit in the purposes of the department.

The outputs of a department are produced by the application of resources available to the organization, such as labor, purchased materials, supplies, and services. Collectively, these resources represent the inputs of the department.

By establishing a relationship between outputs and inputs at the

program level, where physical outputs generally represent end products or services to the public, it is possible to establish what may be termed productivitiy ratios. Such total indicators of productivity are useful at higher levels of management for observing the trend of over-all performance in a department, the comparison of productivity results to other agencies, and relate the productivity experience to productivity data for the private sector.

The measurement of productivity and work is alike in that both permit developing a relationship of outputs to the use of resources or inputs. Productivity ratios can provide information on trends, and highlight for top management attention, broad categories of consumed and available resources. Detailed trend analyses and data required for day-to-day management are also available by performance ratios produced through work measurement or unit-cost systems.

Beyond these approaches to management, output-input relationships center on the effect of work performed, but are also used to assist higher levels of management when making decisions on alternative courses of action. For this purpose, a relationship established between the ultimate benefits gained by a particular program and the cost of all resources used for that program will assess the economic benefits and make analyses that permit comparison with other possible courses of action. This process has a variety of names, such as cost-benefit analysis, cost-effectiveness analysis, feasibility studies, cost-utility analysis, systems analysis, and others. Regardless of what it is called, the objective of this process is to develop comprehensive analyses for each of two or more competing program

projects, and permit a comparison that will show which of the competing alternative will provide the greatest economic return.

VI. THE APPLICATION OF DISCOUNTED CASH FLOW TO PLANNING, PROGRAMMING, BUDGETING

Discounted Cash Flow - Defined

Cash flow is an accounting and financial term denoting the transfer or movement of liquid funds, from one accounting entity to another. Because cash receipt and disbursement statements play an important part in governmental expenditures and budget analysis, the cash positions of the funds of various governmental agencies and departments are under constant scrutiny in order to determine immediate cash needs (payroll and current expenses) and desired liquidity. In government, as in industry, control of cash inflow and cash outflow is an effective management tool which attempts to maximize the worth of every dollar spent, thereby reducing the cost of money.

Money has a cost. While it moves in and out of any given entity its value is constantly changing. Discounted cash flow recognizes that the importance of the dollar from a budgeting standpoint, lies in what it will actually buy. Real value refers to the buying power of a dollar, not only related to inflationary economic tendencies, but also to changing external and intrinsic factors, as they apply to any PPB program.

Discounted cash flow is a standard of financial measurement expressing future monetary value (tomorrow's dollars) in terms of today's present-value dollar. Factors combine as determinants of a value or interest rate which can be applied to calculate the "present value" of any future dollar

amounts. In investment analysis, this valuation method is the present-value theory. Simply stated, given a specific interest rate and a specifice period of time, it is possible to quantify expenditures and cash flows in terms of a given standard being the present value of the dollar.

Discounted Cash Flow - Methodology

A specific amount of dollars, a specific period of time, and a specific discount or interest rate are all this is needed for the application of discount cash flow.

This technique can be applied in two ways: (I) the present value of $1 at a compound interest rate, and (II) the present value of an annuity of $1 per period.

I. Example Problem of Governmental Unit A:

What is the present value of a $120,000 projected increase in Property Taxes Receivable estimated to be due two years from now and discounted at 6% per annum?

PV = .8899 x $120,000

PV = $106,788

The present value of one dollar to be received at the end of two periods where interest is compounded at the rate of 6% per period is 88.99¢.

The present value of $120,000 discounted at 6% per year for two years equals $106,788.

II. Example Problem of Governmental Unit B:

What is the present value of the obligation to redeem $1,000,000 in Serial Bonds Payable, due in that amount, one, two, and three years from now, if the discount rate equals 6% per annum?

The present value of the obligation to pay out one dollar each year for three years is $2.67301.

The future payments of Serial Bonds Payable in the amount of $1,000,000 due exactly one, two, and three years from now, at a discount rate of 6%, give these $3,000,000 in future payments a present value of $2,673,000.

Discount Rate - the Key

The discount rate is the computed value which a sum of dollars decreases per period under a set of decreasing rate-factor determinants.

The basic value of the application of discounted flow depends upon the applied discount rate. The two other components, time and cash flows, which make-up the present-value function are ascertained more easily. The key to successful and useful application of the present-value technique rests with the reliability of the variable factors used to compute the discount rate.

Realistically, any number of factors of varying significance could be used to derive the discount rate, but, drawing too many factors into any single rate computation may render it meaningless.

Any factor can be valued for discount purposes. The following four factors are the most important variables considered in computing a discount rate:

1. The time value of money - the purchasing power of the dollar historically has decreased with time due to increasing costs.
2. Value line element - as funds become available they can be directed to any of several programs. Immediate and long-run

values for individual programs can be analyzed and compared, at any given points in time, with value scales being set up in order to seek the most fruitful movement of various sums of money. To illustrate: if the long-run value of a public safety program to a local government was 94 utils (util being a standard of measurement used to compare the long-run future benefits of different programs) and the long run value of proper parking facilities was 53 utils, then it can be concluded, holding all other elements constant, that a much greater amount of wealth should be directed to the public safety program in comparison to parking.

3. Opportunity rate consideration - this refers to elements outside of direct government control; other sources to which funds can be employed. It helps to answer the question of whether a given function is best performed by government.

4. Rate of adjustment factor - ~~introduces~~ introduction of into discount rate calculation all other factors, i.e. unemployment in a given locale, the size of a geographic area, population trends, etc.

Applications

Discounted cash flow possesses diversified applicability, lending very readily to many facets of PPB, as indicated by these enumerated purposes:

1. To measure the performance of programs and the degree of attainment of goals.

2. To determine the effective cost of items of expenditures,

activities, and programs,

3. As a decision-making variable for budget analysis,
4. As a control device over cash outflow,
5. To aid in construction of program models,
6. To evaluate future revenue needs,
7. To provide analytical comparisons of alternatives.

Advantages

Since PPB programs are designed as long-term structures with operating plans extending five years or more into the future, the application of discounted cash flow, with its ability to express real dollar value in terms of present value, makes it a valuable budget and planning tool.

Discounted cash flow enables —

1. More meaningful and flexible comparisons and analyses of dollar flows.
2. An evaluation method which identifies the values of future cost with precision.
3. An accurate means for quantifying many variables.

Disadvantages

The application of a discount rate is a sound and logical technique, but it is a difficult and tedious task requiring extensive record-keeping and cost accumulation. The discount rate often becomes no more than an arbitrary figure, since not all cost effectiveness can be stated in measurable dollar form. Other disadvantages of discounted cash flow are:

1. Cash does not flow in smooth, even patterns and therefore, it is difficult to apply the technique.

2. Dollar amounts are not the only measure of benefits derived from a program.

3. Factors which influence the discount rate are in a constant state of flux and cannot be pinpointed.

While discounted cash flow has merit for application to Program Budgeting, particularly because of PPB's emphasis on the long-range approach, the difficulties involved in deriving a discount rate appear to be beyond the scope of current analytical process. As with other budgeting and financial techniques, perfection may be a product of time and experience, and with PPB in its development stages, the application of discounted cash flow could eventually proved to be a practical and an invaluable instrument.